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ABSTRACT

To develop a more realistic and informative evaluation model, a longitudinal study was conducted during 1988-1989 to assess the effects of the developmental education courses in mathematics, reading/study skills, and writing at Embry-Riddle Aeronautical University (ERAU) in Prescott, Arizona. Five quantitative and three qualitative measures were collected and analyzed in regard to academic performance, retention, and student satisfaction data on the 226 students enrolled in the courses during the fall of 1986. Experimental statistics included the correlation of retention, reading score, future grade point average, as well as a comparison to a similar control group who were not placed in the developmental courses. Descriptive statistics included data gathered by a mailed questionnaire and 60 personal interviews on degree of satisfaction, skills usage, and perception of proficiency gained from instruction in these classes. Analysis suggests that developmental courses are effective in addressing the basic mathematics, reading/study skills, and composition skill deficiencies of many entering college students. Three-fourths of the students interviewed felt they were reading and writing as well as other college students. (Appendixes consist of a cover letter and student questionnaire; cover letter and interview questions; an outline of continuing activities and an analysis of the return on the university's investment. Sixteen references are attached.) (MM)

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Assessing the Effects of Developmental Education Courses: An Integrative Evaluation Model

A Research Study
resulting from a
Research Development Grant
Embry-Riddle Aeronautical University
Prescott Campus
Spring 1989

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ABSTRACT

Because Embry-Riddle Aeronautical University has made a commitment to the quality of its educational programs, research studies on student outcomes and institutional effectiveness are necessary. A longitudinal study was conducted during 1988-89 to assess the effects of the developmental education courses in mathematics, reading/study skills, and writing to develop a more realistic and informative evaluation model. Five quantitative and three qualitative measures were collected and analyzed in regards to academic performance, retention, and student satisfaction data on the 226 students who were enrolled in the courses during the fall of 1986.

The experimental statistics included the correlation of retention, reading score, future grade point average, and success in the required college level courses, as well as a comparison to a similar control group who did not place in the courses. The descriptive statistics included data gathered by a mailed questionnaire and sixty personal interviews on degree of satisfaction, skills usage, and perception of proficiency gained from instruction in these classes.

The quantitative data suggests that the courses are effective in addressing the basic mathematics, reading/study skills, and composition skill deficiencies of many entering college students. The success rate of all three classes are high, ranging from 91% to 64%. Also, the developmental humanities courses are meeting the objective of preparing students for the subsequent college level

course: 72% of the students receive a passing grade. Although the retention rate of 40% is low, the grades received in the developmental courses do predict future grade point average and success in the college level class. Other indicators of effectiveness are the data from the matched SAT/ACT group. No significant differences were found in retention or grade point average, even though the experimental group was inadequately prepared for college at matriculation. The developmental courses successfully intervened in time to make these marginal students academically competitive without a significantly different attrition rate.

The qualitative data corroborates and extends the quantitative statistics. According to the questionnaire results, over three-fourths of the students consider the developmental courses helpful. Ninety-one percent of the writing students and 82% of the math students felt that the courses prepared them for college level work. Furthermore, over three-fourths of the students interviewed felt that they are reading and writing as well as other college students.

Recommendations based on the analyzed information include a continuation of the developmental course structures with slight instructional modifications suggested by student responses. Since the highest percentage of positive responses related to a caring instructor, careful selection of adjunct and full-time faculty must be maintained. Placement procedures must be investigated since many students felt they were misplaced. We feel that the study

should be replicated in two years to determine the effect of the 1987 admission standards policy, especially on grade point averages and retention.

In conclusion, this research study verifies that the developmental education courses at ERAU, Prescott have a positive effect on student academic performance and earn a high degree of student satisfaction even though they are mandatory and do not carry degree credit. When implemented, the recommendations should only improve an already effective and valuable academic program.

TABLE OF CONTENTS

Abstract ii

Introduction 1

Method 3

Results. 5

Discussion 19

Conclusions and Recommendations. 25

References 27

Appendices

A. Student Letter and Questionnaires. A1-4
B. Interview Letter and Questions B1-4
C. Continuing Activities and Return to University . .C1-2

Universities across the nation are committed to improving and strengthening the educational quality of their academic programs. One way in which institutional effectiveness is evaluated is by assessing student outcomes and reactions after completing certain academic requirements. This study assesses the effectiveness of the developmental education courses in reading, writing, and mathematics. It is based upon the academic performance, retention, and student satisfaction data of the 226 students who were enrolled in the courses during the fall of 1986.

The results not only provide valuable evaluative and retention data, but they also include conclusions and recommendations for instructional and curriculum decisions. Furthermore, the research design and procedures create a prototype for evaluating college developmental education which goes beyond the current use of pre-and-post test scores.

The recent literature on developmental education contains advice on evaluation. In the past, evaluation has focused on quantitative data only. However, many researchers (Maxwell, 1971; Sanders, 1980; Dumont, 1982; and Shea, 1984) now agree that evaluation cannot be measured by standardized test performance, or improved grade point average, or retention figures, or other hard data analysis alone. While this emphasis is important, it does not evaluate all the areas of improvement that occur as outcomes in special college programs. Qualitative research offers insight into student ideas, values, and individual interpretation of experience (Silverman, 1983). It provides researchers with information

concerning the students' affective development and thus enhances quantitative documentation. Student reactions regarding learning, satisfaction, and suggestions for instructional material and objectives can only be gathered through questionnaires and personal interviews.

Therefore, an integrative evaluation model was used which included both experimental and descriptive statistics to provide a more comprehensive assessment of reading/study skills, writing, and mathematics course goals (Maring, Shea, & Warner, 1987). The following questions were investigated:

1) What percent of students taking developmental course work in the fall of 1986 were retained after 4 semesters of class work ending December of 1988?

2) Is the grade in developmental course work a predictor of retention?

3) Is the post-test standardized reading score a predictor of future grade point average?

4) Is the grade in developmental course work a predictor of future grade point average?

5) Is the grade in developmental course work a predictor of the grade in the subsequent required college level course in humanities and mathematics?

6) Using two groups of students with the same SAT scores, where one group took developmental courses and one did not, is there a significant difference in retention and grade point average?

7) How do students evaluate the developmental courses they have taken (satisfaction, skills usage, and perception of proficiency gained)?

METHOD

The following information was collected from the registration office on the 226 freshmen or transfer students who were enrolled in MA105: Quantitative Skills, HU117: Reading and Study Skills, and HU106: Developmental English in the fall of 1986 and placed into a database using dBaseIII+:

a) student names
b) developmental course(s) enrolled in
c) fall 1988 retention data
d) fall 1988 cumulative grade point averages
e) verbal and nonverbal SAT/ACT scores
f) post-test Nelson Denny standardized reading test scores
g) grades from developmental and college-level courses

Grade distributions for the developmental courses and the introductory college level humanities and mathematics course (HU 122 and MA 111 in most cases) were compiled. Comparative analyses were conducted to ascertain whether the grade in the developmental class predicted retention and success in the subsequent humanities and mathematics course. This was derived by applying the Chi-square technique with frequency distributions corresponding to grades received. Only grades received in the first attempt to complete the developmental course were used; second, and third attempts were not included in the study. The data involving course performance were inclusive of only letter designations reported at the end of the semester, thereby excluding the designations for incomplete (I) and withdrawal (W).

Current cumulative grade point averages were obtained in the records office and the post-test Nelson Denny Reading Test scores were compiled by the HU117 Course Monitor in the Humanities

Department. The Pearson's Coefficient of Correlation was used to determine whether the developmental course grade and post-test reading score are predictors of a student's grade point average two years later.

In order to compare the impact on GPA with a control group, 20 students with an entering Scholastic Aptitude Test (SAT) score of 400 to 450 on the verbal and nonverbal sections who did not place into the developmental courses by the departmental placement tests were selected. American College Testing (ACT) scores were converted to SAT equivalents by using the conversion formula (Vroonland, 1988):

$$SAT = ACT \times 20 + 55$$

A t-test was conducted to discover whether there is a significant difference between the equal ability groups.

In addition, the retention data were analyzed and reported in percentages. If the student was not enrolled in the fall semester of 1989, he or she was included in the attrition count. This procedure did, unfortunately, count as drop-outs a few students who are planning to eventually return to ERAU.

An investigator-developed questionnaire was field tested for each of the three developmental courses after a review of the literature provided two examples (Pasch, 1980; Laritsky & Brewer, 1984). A multiple choice format was used with "a" through "e" revealing degrees of agreement, disagreement, and non-applicability. A cover letter with directions, the three questionnaires, a scan-tron answer sheet, and a return envelope

were sent by registered campus mail to the 92 remaining students in the initial 226 population. (Questionnaire materials are included in Appendix A.) The data collected from the questionnaires were analyzed by percentages and are reported in this study with the questions.

Twenty students were then randomly selected from each developmental course and personally interviewed by the investigators. Semi-structured, open-ended questions were developed to gather further detailed information concerning perceived value of courses, suggestions for course improvement, and other important information. (Interview questions are included in Appendix B.) Probing was used whenever necessary, and some extraneous information was discussed, but not reported in the study. Data from the interviews are reported by categorizing when possible and listing each response when not possible. Common responses are given a number to represent the number of times that answer was provided. Interview responses are reported under each of the questions.

RESULTS

The results of this study are presented in a combination of tables and prose in response to each of the research questions. Additional statistical analyses that were later considered necessary to interpret the results are also described.

1) <u>What percent of students taking developmental course work in the fall of 1986 were retained after 4 semesters of class work ending December of 1988?</u>

The percentage of students in Table 1 reveals the enrollment status two years after each of the developmental courses in which they were enrolled.

TABLE 1: OVERALL RETENTION

Course	%	# Retained	# Not Retained
MA 105	40%	92	137
HU 117	38%	42	69
HU 106	38%	54	90

Student SAT/ACT scores were correlated with the retention figures: MA 105 has a correlation of 0.16 with the nonverbal SAT score; HU 117 has a rate of 0.14 with the verbal SAT score; and HU 106 has a rate of 0.24. None of the three are considered statistically significant. Of students who took both the humanities courses and the math course (an N of 28) the correlation is 0.22, again too low for significance.

2) <u>Is the grade in developmental course work a predictor of retention?</u>

Table 2 contains the grades received as well as the number breakdown for retention (R represents those retained, and NR those not retained). The overall pass rate (students receiving a C or above) for each of the courses is as follows: MA 105 with 63%, HU117 with 91%, and HU106 with 84%.

TABLE 2: GRADE AS PREDICTOR OF RETENTION

	MA105		HU117		HU106	
Grade	R	NR	R	NR	R	NR
A	13	13	23	23	19	14
B	26	17	11	17	24	29
C	7	16	8	6	12	26
D	6	11	1	9	0	9
E	5	21	0	13	0	14

df = 4 at the .01 level of significance $\chi^2 > 13.28$ is significant

The Chi-square test indicates that the grades earned in MA 105 and HU 106 do serve as a predictor of retention with 13.74 and 21.3 respectively. Grades earned in HU117 (8.06) do not serve as a retention predictor at this level of significance.

3) Is the post-test standardized reading score a predictor of future grade point average?

Table 3 presents the statistics regarding reading scores and grade point average (GPA).

TABLE 3: READING SCORE AS PREDICTOR

	$\bar{x}$	θ	max.	min.
Post-test score	10.91	1.88	14.4	6
GPA	2.17	.87	3.8	0

With a Pearson's Coefficient of Correlation of .12, the correlation is very low, not statistically significant to consider the post-test reading scores as a predictor of a student's future grade point average.

4) Is the grade in developmental course work a predictor of future grade point average?

Yes, a grade in each of the three developmental courses serves as a predictor of future grade point average. HU 117 and HU 106 have a fairly high correlation of 0.76 and 0.77 respectively. MA 105 has a lower correlation of 0.60, but it is within the range to be considered statistically significant.

5) Is the grade in developmental course work a predictor of the grade in the subsequent required college level course in humanities and mathematics?

A Chi-square test reveals that grades earned in all three courses do serve as predictors for grades in the required college level courses (HU122 and MA111 in most cases) with the following figures: MA105 with 64.8; HU117 with 33.7; and HU106 with 33.23. Table 4 contains a grade matrix for students in the developmental courses and the required college level courses.

TABLE 4: GRADE MATRIX
HU 122

HU 106	A	B	C	D	F
A	7	15	2	0	2
B	2	8	14	9	4
C		9	9	6	4
D			3	1	1
F					

HU 122

HU117	A	B	C	D	F
A	7	15	6	5	3
B		6	10	2	1
C		5	3	2	1
D				3	2
F			1		1

MA 111

MA105	A	B	C	D	F
A	6	12	2	2	2
B	3	8	15	3	6
C		2	3	5	10
D				8	2
F			1	1	3

df = 16 at the .01 level of significance $\chi^2 > 32.00$ is significant.

Table 5 presents the number and percent of students who passed the developmental courses and earned a C or better in HU122 and MA11.

TABLE 5: REQUIRED COURSE PASS RATE

Course	Number passed	Percent passed
MA 111	51 out of 94	54%
HU 122	52 out of 73	71%
HU 122	69 out of 96	72%

6) Using two groups of students with the same SAT scores, where one group took developmental courses and one did not, is there a significant difference in retention and grade point average?

Table 6 and Table 7 present the results of the t-test to determine the effect of the developmental courses on retention and GPA in contrast to a control group.

TABLE 6: GPA DIFFERENCES

	Experimental Group			Control Group			
Course	n	$\bar{x}$	s	n	$\bar{x}$	s	t-test
MA 105	17	2.57	.58	26	2.65	.94	- .31
HU 117	15	2.22	1.48	26	2.65	.94	- .53
HU 106	12	2.17	1.27	26	2.65	.94	-1.31

$n_1, n_2 < 30$ df = 41 MA 105, df = 39 HU 117,
df = 36 HU 106 $t > 1.96$ or $t < -1.96$ is significant

The t-test reveals that there is no statistically significant differences at the .05 level between the two matched groups. Even though the experimental group needed the developmental classes when the students entered ERAU, two years later there is no difference in GPA from those students with the same SAT/ACT score who did not need the developmental instruction.

TABLE 7: RETENTION DIFFERENCES

	Experimental Group			Control Group			
Course	n	x	s	n	x	s	t-test
MA 105	17	.71	.47	26	.5	.51	+1.36
HU 117	15	.40	.51	26	.5	.51	- .58
HU 106	12	.42	.51	26	.5	.51	- .45

$n_1, n_2 < 30$; df = 41 MA 105, df = 39 HU 117, df = 36 HU 106

Again the t-test reveals there is no statistically significant difference between the two matched groups regarding retention.

7) How do students evaluate the developmental courses they have taken (satisfaction, skills usage, and perception of proficiency gained)?

Data for this research question were collected by a questionnaire for each developmental course and personal interviews. Tables 8 through 13 present the results of the questionnaires and interviews for MA105, HU117, and HU106 respectively.

TABLE 8
STUDENTS' EVALUATION OF MA 105: QUANTITATIVE SKILLS

	A	B	C	D	F
1. I feel that MA 105 prepared me for my next math course.	41%	41%	17%	0%	0%
2. I feel that MA 105 has helped me do better in classes other than mathematics.	15%	41%	11%	28%	4%
3. As a result of MA 105, I feel differently about math than I did before I started.	20%	24%	46%	9%	2%
4. I feel that regular attendance in MA 105 was important to my grade.	43%	39%	4%	13%	0%
5. I feel that my instructor cared how I did in class.	24%	59%	4%	13%	0%
6. I feel that I was properly placed in MA 105.	30%	35%	4%	26%	0%
7. I feel that in general MA 105 was helpful.	43%	39%	4%	13%	0%

* 46 students responded out of 92 enrolled Fall 1988, yielding a 50% return rate.

TABLE 9
MA 105 INTERVIEW RESPONSES

1. **What was the reason you needed to take a brush up course in Algebra?**
   I haven't taken a math course for years. - 10
   My background in high school was weak. - 6
   I hadn't taken a math during the summer. - 2
   With the confusion of registration, I couldn't concentrate on the placement test. - 1
   I needed a short review before the placement test. - 1

2. **Did MA 105 prepare you for your next mathematics courses?**
   yes 14 no 6

   If not, why?
   I was prepared for the next course before taking MA 105. - 3
   Most of the material I needed was not taught in MA 105. - 2
   MA 105 was too easy in comparison MA 111.

3. **What skills did you learn that helped you in your next math course?**
   I learned to study because homework was required. - 6
   I learned the basic concepts of Algebra. - 3
   Repetition forced me to learn.
   Good review of the skills needed in Algebra.

4. **What improvements could we make in MA 105?**
   Give a better placement test, I shouldn't have taken it. - 3
   Give credit for the class toward your degree.
   Cover more material.
   Move at a faster pace.
   None. - 14

5. **Would a review session given by instructors the day before the placement test have helped?**
   yes 8 no 12

6. **Do you have any suggestions regarding ERAU's current math curriculum?**
   No suggestions (okay the way it is). - 5
   Have math teacher teach math. - 2
   MA 112 is a waste of time. - 2
   Put trig in MA 105.
   No exams the week before the finals.
   Change the title of MA 112, good course.
   Condense MA 105 to cover more material.
   Math is too difficult, don't need calculus.

* 20 students were personally interviewed, representing 18% of fall 1986 MA 105 students who were enrolled in the fall of 1988.
9

TABLE 10

STUDENTS' EVALUATION OF HU 117: READING AND STUDY SKILLS

		A	B	C	D	E
1.	I feel that my overall reading ability was improved in HU117.	42%	31%	24%	3%	0
2.	I feel that the study skills taught in HU117 have helped me do better in my other classes.	21%	42%	34%	3%	0
3.	I feel that my instructor cared how I did in class.	62%	31%	3%	3%	0
4.	I feel that I was properly placed in HU117.	32%	24%	24%	17%	3%
5.	I feel more confident in myself as a student as a result of HU117.	24%	17%	35%	17%	6%
6.	I feel that in general HU117 was helpful.	28%	45%	17%	10%	0

I feel that the following skills have been helpful in the courses I have taken:

		A	B	C	D	E
7.	Previewing	24%	42%	34%	0	0
8.	Textbook Reading:SQ3R	31%	41%	28%	0	0
9.	Summarizing	21%	55%	24%	0	0
10.	Vocabulary	21%	45%	34%	0	0
11.	Speed Improvement	24%	42%	31%	3%	0
12.	Note taking Tips	24%	45%	28%	3%	0
13.	Time Management	31%	39%	24%	6%	0
14.	Stress Reduction	21%	38%	31%	10%	0
15.	Preparing for Exams	14%	55%	21%	10%	0

Two Comments: 1. The instructor was able to make the subject more enjoyable for the class. 2. Overall, the course has been an asset to the courses I have taken. If possible, it would be nice if seminars on Stress Reduction or a few other skills could be given as refreshers.

*29 students responded out of 42 enrolled Fall 1988, yielding a 69% return rate.

TABLE 11
HU117 INTERVIEW RESPONSES

1. **Do you think taking HU117 helped in later college courses?**
   Yes - 15 No - 5

   If so, which ones and how.
   I read more now than ever before. - 5
   Taught me how to study. - 3
   I never read before; now I read for pleasure. - 3
   I learned how to read a textbook. - 3
   I comprehend more and read faster now. - 2
   Taught me how to write a book report. - 2
   I have dyslexia and yet it got me up to the 12th grade level
   It was tedious. I didn't know enough about what I was doing to improve my skills.
   I feel that friends who don't take the course, do less well even back home.

   Student comments on which courses HU117 has helped:
   All of Business courses. - 2
   Helped in every course when I have to read.
   Speed and comprehension needed in lots of classes.

2. **What are some of the things you studied in HU117 that you feel has helped the most?**

Time management - 9	Textbook study - 4
Speed reading - 8	Summarizing - 4
Note taking - 7	Skimming - 2
Vocabulary - 6	Stress reduction - 2
Exam preparation - 5	Goal setting - 1

3. **Is there any reading or study skill you have needed for college courses that was not included in HU117 and should be?**
   None - 11
   How to study calculus/math. - 2
   How to read difficult material, beyond the college level.
   More memory improvement.
   More on reduction of test anxiety.
   How to write a physics lab report.
   Get more specific: how to read different types of texts.
   More on how to study reading and lecture notes.
   How to stop procrastination.

4. **Now after two (2) years, what suggestions for improvement can you make for HU 117?**
   No suggestions. - 3
   Liked the speed machines. - 4
   Liked the book reports. - 3
   Workload helped introduce to college work. - 3
   When I look back, it's scary to actually learn something.
   More time needed for vocabulary book.

Reduce amount of summaries.
Not enough vocabulary work.
More vocabulary tests needed.
Emphasize the need for the course more.
Add an overview for speeches.
More time necessary.

5. **What did you like the best about HU 117?**

My reading skills improved. - 5
Okay as is - 4
Instructor - 4
Study skills - 3
How to read a text -3
I like many things.
Improving amount and desire to read.
Made me feel more confident because I saw my progress: I was getting fast and getting 90% instead of 40%.
Vocabulary book
Summary writing
Book reports
Individual book choice

What did you like the least about HU 117?

Speed machines, but they helped. - 4
Everything helped. - 3
Can't remember. - 3
Efficient Reading book. - 3
Vocabulary tests. - 2
Tedious, pointless work.
7:40 am time.
Keeping up on notebook work.
Books were helpful, but not enjoyable.

6. **Do you think additional reading or study assistance is needed at ERAU?**

No - 10 Yes - 6 Don't know - 4

Suggestions:

Advanced reading class as elective. - 5
Additional study help by professors, not tutors. - 2
More organized study groups needed on campus - 2
I signed up at Yavapai College Learning Center for a 1 hour study skills class so I could use the faculty tutoring in all subjects.
Tutors here know less than I do.

7. **Do you think you are reading as well as other college students?**

Yes - 15 No - 5

Comments:

Below average in speed. - 5
I still have trouble remembering what I read. - 2
Yes, except for notetaking. I write every word.
Now I do; I didn't before HU117.
For technical reading, yes.
Vocabulary could be better.
Comprehension isn't as good as it should be.

* 20 students were personally interviewed, representing 48% of fall 1986 HU117 students who were enrolled in the fall of 1988.

TABLE 12

STUDENTS' EVALUATION OF HU 106: DEVELOPMENTAL ENGLISH

		A	B	C	D	E
1.	I feel that the writing techniques and skills taught in HU106 prepared me for my next Humanities class.	58%	33%	6%	3%	0
2.	I feel that the writing techniques and skills taught in HU106 have helped me do better in classes other than Humanities.	40%	48%	12%	0	0
3.	I feel that my HU106 instructor cared how I did in class.	76%	21%	3%	0	0
4.	I feel that I was properly placed in HU106.	36%	36%	19%	6%	3%
5.	I feel that in general HU106 was helpful.	43%	45%	12%	0	0
6.	I feel that my present level of writing proficiency is average for the demands of college instruction.	36%	49%	15%	0	0

I feel that the following activities have been helpful:

		A	B	C	D	E
7.	Developing a Thesis Statement	48%	46%	6%	0	0
8.	Using Transitional Words	42%	48%	10%	0	0
9.	Outlining an Essay	42%	42%	13%	3%	0
10.	Types of Introductory, Supporting, and Conclusion Paragraphs	55%	42%	3%	0	0
11.	Punctuation	40%	54%	6%	0	0
12.	Spelling Tests	21%	40%	36%	3%	0
13.	Journal Writing	16%	36%	36%	12%	0
14.	Writing Better Sentences	42%	55%	3%	0	0

One comment: This class did seem to help at the time, but too much information in a short period of time made for less retention of all the skills I thought.

*33 students responded out of 54 enrolled Fall 1988, yielding a 61% return rate.

TABLE 13
HU106 INTERVIEW RESPONSES

1. **Do you think taking HU106 helped in later Humanities and other college courses?**
   Yes = 18 No = 2

   Is so, which ones and how?
   I had a poor or no background in English. - 7
   Grade in HU122 higher because of HU106. - 6
   I needed a review of the basics. - 5
   Helped gear me up for college work. - 3
   It folds right in HU122. - 3
   Probably wouldn't be here if I didn't take it.
   It has helped in just about every course I've taken.
   Helped me learn the English language better.
   Concentrated too much on basics. I felt misplaced.

   Student comments on which courses HU106 has helped:
   Reports for AS405, AS415, AS 105; Almost all Business courses; Psychology; Speech; Computer Science courses.

2. **What are some of the things you studied in HU106 that you feel has helped the most?**

Structure of an essay - 10	Essay question writing -2
Thesis statement - 5	Transitional words - 2
Sentence structure - 3	Journals - 2
Punctuation and grammar - 3	Brainstorming
Outlining - 3	Fear of writing disappeared
Spelling Tests - 3	Don't know

3. **Is there any writing skill you have needed for college courses that was not included in HU106 and should be?**
   None - 14
   Use essay topics and exams from other classes.
   Include how to write business and lab reports.
   Preparation for different teacher expectations.

4. **Now, after two (2) years, what suggestions for improvement can you make for HU106?**
   No suggestions. - 7
   Keep assignments related to aviation. - 3
   Make it mandatory for all freshman.
   Stress the importance of the class early.
   Use Air Science reports as examples.

Journals helped me organize my thinking.
Loved the class; still using a few papers.
Change the textbook.
More writing practice.
Journals didn't help.
More practice at looking at sentence structure.
Use computerized spelling instead of tests.

5. **What did you like the best about HU 106?**

Instructor - 8	Review - 2
Relaxed atmosphere - 5	Essay topics - 2
Writing experience - 2	Journals - 2
Meeting other foreign students	

What did you like the least about HU 106?

Nothing specifically. - 5	Too much like high school. -2
Journals. - 4	Doesn't count for degree.
Can't remember. - 3	Don't like English classes.
Spelling tests. - 3	

6. **Have all your writing needs been served by the Writing Lab?**

Haven't ever used it. - 8	Yes - 3
Haven't used it since HU 106. - 2	
Used in once. - 2	Use instructor instead.
Used it twice. - 3	Use Yavapai College.
Learning.	Center instead.
Use it a lot. - 2	

Why haven't you used the Writing Lab? (Asked of those who have never used it or used it only once or twice.)
Person was too critical of my writing.
Limited time it's open.
Needs more hours.
I should go more often.

7. **Do you think you are writing as well as other college students?**
Yes - 16 No - 4

Comments: Yes, but when I came to ERAU, definitely not.
More spelling and vocabulary needed.
No, I need to go back to 106 for review!

8. **What do you like the best about ERAU?**
Small size study body and classes. - 8
Instructors friendly and available. - 8
Aviation interest and degree at same time. - 5

People - 4	Fewer distractions. - 2
West - 2	Hands-on teaching.
Fun place to be - 2	Outdoor sports.

9. **What do you like the least about ERAU?**
Limited social activity if under 21. - 3
Cost too much - 2

Money more important than student. - 2
Too military oriented. - 2
Misleading information on flight line. - 2
Too far from big city. - 2
Not enough electives.
More study area needed.
More effort is needed to help us graduate, not just enroll.

*22 students were personally interviewed, representing 40% of fall 1986 HU 106 students who were enrolled in the fall of 1988.

DISCUSSION

An evaluative assessment of ERAU's developmental courses by student academic performance and student perceived instructional value is the purpose of this study. The conclusions are based on the descriptive and inferential analyses presented.

The data suggest that the courses are successful in addressing basic mathematics, reading, and composition skill deficiencies of many entering college students. HU 117 has the highest percentage of students achieving a satisfactory grade (91%), then HU 106 (84%), and MA 105 (64%). These completion rates are significantly higher in reading and writing courses than the course completion rate of 2,785 two- and four-year institutions. A national survey conducted by Margaret Cahalan and others (1986) reveals that remedial courses were successfully completed by an average of about 74% of those taking reading, 71% taking writing, and 68% taking mathematics. Also, the developmental humanities courses are meeting the objective of preparing students for the subsequent required college level course. The performance of students reveals adequate preparation for HU 122, Freshman Composition and Literature I. Seventy-two percent of the developmental students receive a passing grade in HU 122. This percentage is almost the same as that Bellot and Bowman (1983) found

in their comparative assessment of student performance in developmental and freshman English courses. In contrast, MA 105 may not be preparing students adequately for MA 111, Intermediate Algebra, since only 54% receive a passing grade in MA 111. However, this figure is within the 26% to 50% pass rate of one-third of the 165 developmental math programs reported in a national survey by McDonald (1988). The MA 105 figure may be explained by the fact that in the fall of 1986, there were no admission requirements and many of the developmental students who failed MA 105 or MA 111 did not have high school algebra and could not work at the pace at which the material was covered.

Other indicators of success are the data from the matched-groups comparison. No significant differences are found in retention or grade point average between the developmental and the nondevelopmental students. This finding is consistent with evaluative information from other studies (Maxwell, 1971; Fairbanks, 1974). It is highly improbable that the developmental students who entered with inadequate proficiency would outperform the proficient control group. Therefore, the fact that the deficiencies were remediated in time for competitive academic achievement without a significant difference in attrition is noteworthy and encouraging.

In contrast, grades received in the developmental courses do serve as predictors of future grade point average when analyzed alone. Furthermore, the grades received in developmental English and mathematics are also predictors of retention. In addition to the grade from the reading class not correlating to retention, a student's overall reading ability does not correlate to future grade point

average. This finding conflicts with evaluative data from other college programs (Chand, 1985; Maxwell, 1971). The fact that reading ability does not positively correlate to academic performance could be explained by the nature of ERAU's math and science oriented curriculum or that the average reading score of 10.9 grade equivalent is sufficient for academic success.

The information analyzed from the questionnaires seems to corroborate the overall success of the developmental courses. All three courses are considered helpful: 88% for HU 106, 82% for MA 105, and 73% for HU 117. The highest ratings relate to a caring instructor with 97% (HU 106), 94% (HU 117) and 83% (MA 105) of the students feeling their instructor cared about their progress. Placement views received a greater divergence with 72% (HU 106), 65% (MA 105), and 56% (HU 117)of the students feeling properly placed. Another area of difference is the percentage of students who feel that the developmental courses prepared them for the college level course ninety-one percent of the developmental English students feel like it did, but only 55% of the developmental math students feel like MA 105 prepared them for MA 111. In addition, 88% of the English students feel that HU 106 has helped them perform better in classes other than humanities.

The information gained from the personal interviews again support the general response of student satisfaction with the developmental courses. Furthermore, many valuable suggestions and reactions were received.

MA 105 Summary of Interview Responses

Seventy percent of the students interviewed think MA 105 helped in later college classes and felt no improvement could be made in the course. Fifty percent have been out of school for some time and have forgotten the mathematics they once learned. Thirty percent relate a very poor background in high school mathematics, some having never even completed beginning algebra. The largest complaint (15%) is that they do not feel they were placed correctly into MA 105, and ten percent do not believe the material was covered was at a fast enough pace. Forty percent feel that a review of algebra conducted before the placement exam would have refreshed their mathematical skills enough to change the results of their placement exam. Other suggestions include: college credit should be given for MA 105, and MA 105 should be taught by mathematics teachers (one instructor was an engineer).

HU 117 Summary of Interview Responses

Seventy-five percent of the students interviewed think that HU 117 helped in later college courses. Forty percent commented that they now read much more than before the course, and in particular read more for pleasure. Fifty percent of the comments related to learning how to study better. Several suggestions of adding specific reading and study skills were given; however, the majority feel that the course includes everything they needed for college study. Course improvement suggestions varied from liking the speed reading machine and the book reports, to more time needed for vocabulary work and tests. Students most like the idea that their reading skills

improved. Other repeated responses include liking their instructor and study skill instruction the most. Among the least liked aspects about HU 117, the speed reading machines are mentioned the most, although all the respondents agree they were helpful. The reading text and vocabulary tests are the next least liked items. Fifty percent of the students feel that additional reading or study assistance is not needed. Twenty-five percent say they would enroll in an advanced reading course. Other ideas include more organized study groups and additional help by professors. Seventy-five percent of the students feel that they are currently reading as well as other college students. Inferior speed, retention, comprehension, and vocabulary are mentioned by the twenty-five percent who still think they are reading below the college level.

HU 106 Summary of Interview Responses

An overwhelming 91% of students feel that HU 106 helped in later humanities and other courses. Reasons for this include limited background (35%), higher grades in the college level course (40%), a review of basics (25%), and an introduction to college work (15%). HU 106 is not considered helpful by two students, and they consider themselves as misplaced in the beginning, and consequently, consider the course as being too easy. Seventy percent of the respondents feel that HU 106 includes every writing skill that it should cover. Suggestions include specific essay topics from other classes, instruction on lab reports, and preparation for teacher expectations. Thirty-five percent have no suggestions for improvement. The most popular suggestion is to keep the assignments related to aviation

topics. Other responses vary considerably.

The most liked aspects of HU 106 are the instructor (90%) and the relaxed atmosphere (25%). Essay topics, review, journals, and the writing experience itself, all share ten percent of the comments. Twenty-five percent of the students have no particular reply to the most disliked aspect of HU 106; however, journal writing receives 20%, with spelling tests receiving 15%. Eighty percent feel that they are currently writing as well as other college students.

Other questions concern the use of the Writing Lab and overall reactions to ERAU in general. Forty percent of the students have never used the Writing Lab. Reasons include the limited hours of the lab and an overcritical tutor. Only twenty-five percent feel the Writing Lab serves all their writing needs. The most liked features of ERAU are the small size of the student body and classes and the friendly and available instructors. The most disliked features are the increasing size and the "Riddle Run Around", local slang referring to bureaucratic insensitivity, inflexibility, and incompetence.

CONCLUSIONS AND RECOMMENDATIONS

Based on the collected and analyzed data, the following conclusions and recommendations are offered:

Conclusions

The developmental courses are making a difference in the student's academic performance and the students themselves perceive the influence since they consider the instruction helpful to later college courses. Although the retention percentage is low, the grades received in the classes do predict future grade point average and success in the subsequent college level courses. When compared to an equally matched SAT/ACT group, there are no significant differences in later GPA or retention of the developmental students. This means that the courses are indeed successfully intervening to make college success possible without an unreasonable attrition rate.

Recommendations

1. Continue the developmental course structure with slight instructional modifications:
    a. Include the quadratic formula in MA 105.
    b. Modify the journal assignment in HU 106.
    c. Substitute the spelling tests in HU 106 with computerized instruction.
    d. Add additional vocabulary tests and instruction in HU 117.

2. Continue to select and to screen adjunct and full-time instructors for sufficient training, a caring attitude, and a student-oriented philosophy.
3. Investigate the efficacy of the placement procedures. The Math department has experimented with two methods since the fall of 1986; the Humanities department needs to evaluate its procedure which was implemented 1986.
4. Expand the hours of the Writing Lab. Encourage developmental students to use the services during enrollment in the course and afterwards.
5. Administer the questionnaires as course evaluation for MA 105, HU 117, and HU 106 to identify any changes in student responses.
6. Compute the graduation rate of the remaining 96 students of the original 226 population.
7. Replicate the study in two years to determine the effect of the 1987-88 admission standards policy, especially on the GPA and the retention data.

REFERENCES

Bellot, F. & Bowman, H. (1983). Comparative Assessment of College Student Performance in Developmental and Freshman English Courses. Nashville, TN. (ERIC Document Reproduction Service No. 239-300).

Cahalan, Margaret, et al. (1986). College Level Remediation: Fast Response Survey System Report No. 19. Washington, D.C. (ERIC Document Reproduction Service No. ED 247-290).

Chand, Sunil, (1985). The impact of developmental education at Triton College. Journal of Developmental Education, 9 (1), 2-5.

Dumont, Richard, (1982). A Comparison of Methodological Approaches for Evaluating the Quality of Basic Skills Programs. Cookeville, TN. (ERIC Document Reproduction Service No. ED 220-051).

Fairbanks, Marilyn, (1974). The effect of college reading improvement programs on academic achievement. 23rd Yearbook of the National Reading Conference Interaction: Research and Practice, 105-114.

Heerman, Charles (1983). Research on college reading programs and student retention efforts. Reading World, 23, 203-211.

Maring, G., Shea, M. & Warner, D. (1987). Assessing the effects of college reading and study skills programs: A basic evaluation model. Journal of Reading, 30, 402-408.

Maxwell, Martha, (1971). Evaluating college reading and study skills programs. Journal of Reading, 15, 214-221.

McDonald, Anita, (1988). Developmental Mathematics instruction: results of a national survey. Journal of Developmental Education. 12(1), 8-15.

Pasch, Marvin, (1980). Outcome Evaluation: Student Development Program. Cleveland State University, Ohio, (ERIC Document Reproduction Service No. ED 202-261).

Sanders, Victoria, (1979). A Meta-Analysis: The Relationship of Program Content and Operation Factors to Measured Effectiveness of College Reading - Study Programs, unpublished dissertation.

Shea, Mary Ann, (1984) An Evaluation Paradigm for University Reading and study skills Program Courses, unpublished dissertation.

Silverman, Sharon, (1983). Qualitative research in the evaluation of developmental education. Journal of Developmental and Remedial Education, 6 (3), 16-19.

Vroonland, Jewell, (1988). Personal communications, Oct. 25, 1988.

Wepner, Gabriella, (1987). Evaluation of a postsecondary remedial mathematics program. Journal of Developmental Education. 11 (1), 6-9.

Zaritsky, J. & Brewer, F. (1984). Students Who Have Completed Basic Skills Courses at La Guardia Community College: A Survey. (ERIC Document Reproduction Service No. ED 250-662).

Appendix A

Letter and Student Questionnaires

EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

Dear Student,

Our records show that you were enrolled in one or more of the developmental education classes in the fall of 1986. We are currently conducting a research study to assess the impact of these courses. The attached questionnaire is to help the Humanities and the Mathematics Departments improve the contents and expectations of MA 105: Quantitative Skills, HU 117: Reading and Study Skills, and HU 106: Developmental English.

Please complete each section of the questionnaire that relates to the course(s) you have had. Your honest and complete replies will help future ERAU students as we redesign and update these courses based on your valuable input.

After completing the questionnaire by using the attached scan-tron answer sheets, with a number two pencil, place the appropriate answer sheets and questionnaires in the same envelope as you receivec everything in, and it put into the box labeled "Humanities/Math Survey" in the post office lobby or on the desks of the Humanities secretary (Building 36) or the Math/Physical Science secretary (Building 34) by Wednesday, November 9.

Thank you for giving us approximately 10 minutes of your busy time. We truly appreciate it, and the results of the survey will make a difference!

Sincerely,

Berta Parrish
Humanities

Dick Hiatt
Math/Physical Science

HUMANITIES/MATH SURVEY

SECTION A. COMPLETE THIS SECTION IF YOU HAD MA 105, QUANTITATIVE SKILLS.

Directions: Use the attached scan-tron answer sheet for MA 105. In the following questions, mark one of the following responses:

(a) if you strongly agree with the statement
(b) if you agree
(c) if you disagree
(d) if you strongly disagree
(e) if the item is Not Applicable to the course section you had

1. I feel that MA 105 prepared me for my next math course.

2. I feel that MA 105 has helped me do better in classes other than mathematics.

3. As a result of MA 105, I feel differently about math than I did when I started.

4. I feel that regular attendance in MA 105 was important to my grade.

5. I feel that my instructor cared how I did in class.

6. I feel that I was properly placed in MA 105.

7. I feel that in general MA 105 was helpful.

Please include any comments in the blanks on the pink side of the scan-tron sheet.

NOTICE: Twenty (20) students who took each of the developmental courses in the fall of 1986 will be interviewed for further detailed information and suggestions. Would you like to participate? Mark one of the following: _____Yes _____No

If you marked "Yes" please provide your name below and put this sheet into the envelope along with the answer sheets. Thank you!

NAME:_____

HUMANITIES/MATH SURVEY

SECTION B. COMPLETE THIS SECTION IF YOU HAD HU 117, READING AND STUDY SKILLS.

Directions: Use the attached scan-tron answer sheet for HU 117. In the following questions, mark one of the following responses:

(a) if you strongly agree with the statement
(b) if you agree
(c) if you disagree
(d) if you strongly disagree
(e) if the item is Not Applicable to the course section you had

1. I feel that my overall reading ability was improved in HU 117.

2. I feel that the study skills taught in HU 117 have helped me do better in my other classes.

3. I feel that my instructor cared how I did in class.

4. I feel that I was properly placed in HU 117.

5. I feel more confident in myself as a student as a result of HU 117.

6. I feel that in general HU 117 was helpful.

I feel that the following skills have been helpful in the courses I have taken:

7. Previewing
8. Textbook Reading: SQ3R
9. Summarizing
10. Vocabulary
11. Notetaking Tips
12. Speed Improvement
13. Time Management
14. Stress Reduction
15. Preparing for Exams

Please include any comments in the blanks on the pink side of the scan-trom sheet.

NOTICE: Twenty (20) students who took each of the developmental courses in the fall of 1986 will be interviewed for further detailed information and suggestions. Would you like to participate? Mark one of the following: _____Yes _____No

If you marked "Yes" please provide your name below and put this sheet into the envolope along with the answer sheets. Thank you!

NAME:_____

HUMANITIES/MATH SURVEY

SECTION C. COMPLETE THIS SECTION IF YOU HAVE HAD HU 106, DEVELOPMENTAL ENGLISH

Directions: Use the attached scan-tron answer sheet for HU 106. In the following questions, mark one of the following responses:

(a) if you strongly agree with the statement
(b) if you agree
(c) if you disagree
(d) if you strongly disagree
(e) if the item is Not Applicable to the course section you had

1. I feel that the writing techniques and skills taught in HU 106 prepared me for my next Humanities class.

2. I feel that the writing techniques and skills taught in HU 106 have helped my do better in classes other than Humanities.

3. I feel that my HU 106 instructor cared how I did in class.

4. I feel that I was properly placed in HU 106.

5. I feel that in general HU 106 was helpful.

6. I feel that my present level of writing proficiency is average for the demands of college instruction.

I feel that the following activities have been helpful.

7. Developing a Thesis Statement
8. Using Transitional Words
9. Outlining an Essay
10. Types of Introductory, Supporting and Conclusion Paragraphs
11. Punctuation
12. Spelling Tests
13. Journal Writing
14. Writing Better Sentences

Please include any comments in the blanks on the pink side of the scan-tron sheet.

NOTICE: Twenty (20) students who took each of the developmental courses in the fall of 1986 will be interviewed for further detailed information and suggestions. Would you like to participate? Mark one of the following: _____Yes _____No

If you marked "Yes" please provide your name below and put this sheet into the envelope along with the answer sheets. Thank you!

NAME _____

Appendix B

Letter and Interview Questions

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

PRESCOTT CAMPUS

MEMORANDUM

DATE: November 15, 1988

TO:

FROM: Berta Parrish

SUBJECT: Interview

You have been randomly selected to participate in an important research study.

I am currently interviewing twenty (20) students who completed either HU 117: Reading and Study Skills or HU 106: Developmental English in the fall of 1986. The purpose of the 20-minute personal interview is to get your opinions of the course's value and impact to your subsequent college performance.

The information will help the Humanities Department improve both courses to make them more beneficial to ERAU students. Please help us.

If you cannot make the appointment time stated below, call me at extension 837 or stop by Building 36 and make an appointment for a more convenient time. Thank you in advance for keeping the appointment if you can and calling if you cannot.

I am looking forward to seeing you again!

Appointment Time:

Appointment Date:

HU 117
INTERVIEW QUESTIONS

1. Do you think taking HU 117 helped in later college courses?

   If so, which ones and how.

2. What are some of the things you studied in HU 117 that you feel have helped the most.

3. Is there any reading or study skill you have needed for college courses that was not included in HU 117 and should have been.

4. Now, after two (2) years, what suggestions for improvement can you make for HU 117? (If probing is needed, ask about materials, textbooks, assignments, methods, instructors.)

5. What did you like the best about HU 117?

   What did you like the least about HU 117?

6. Do you think additional reading or study assistance is needed at ERAU? (If probing is necessary, ask about the possibility of workshops, one-hour modules, an advanced reading course.)

7. Do you think you are reading as well as other college students?

HU 106
INTERVIEW QUESTIONS

1. Do you think HU 106 helped in later Humanities and other college courses?

   If so, which ones and how.

2. What are some of the things you studied in HU 106 that you feel has helped the most?

3. Is there any writing skill you have needed for college courses that <u>was not</u> included in HU 106 and should be?

4. Now, after two (2) years, what suggestions for improvement can you make for HU 106? (If probing is necessary, ask about materials, textbook, assignments, methods, instructors.)

5. What did you like best about HU 106?

   What did you like the least about HU 106?

6. Have all your writing needs been served by the Writing Lab?

7. Do you think you are writing as well as other college students?

8. What do you like the best about ERAU?

   What do you like the least about ERAU?

Appendix C

Continuing Activities and Return to the University

PLANS FOR CONTINUING ACTIVITIES

University Plans

Our plans include continuing to monitor retention rates for the Prescott Campus as well as keeping track of the number of students enrolled in our three remedial classes. The mathematics department will change its method of placing students in remedial mathematics classes in the fall of 1989.

Mathematics placement tests for MA 111 will no longer be required and students will be placed based on courses taken in high school as well as the grades that they received for these classes. The actual placement will be done by students after receiving counseling and recommendations. Since MA 111 is equivalent to high school intermediate algebra, universities across the nation are beginning to eliminate this course and require college algebra instead. Embry-Riddle is moving toward this view also and MA 111 may be considered a remedial course in the future. This leads to the possibility of removing MA 105 (first year high school algebra) from our curriculum because of the lack of students with that poor of a background and is turn making MA 111 a remedial course. Placement and retention rate will continue to be monitored. There are no absolutes and changes in placement procedures and in course content will be on-going.

Our study indicated that the humanities remedial courses are meeting the needs of the students. No major changes are anticipated however, the current placement procedure will be investigated and possible improvements recommended to the department chair and course monitors.

The other listed recommendations of the study will be also monitored and evaluated when they have been implemented or completed.

Dissemination Plans

We are currently writing a manuscript, "An Integrative Model for Evaluating College Developmental Courses," for submission to a professional journal. This will allow other developmental educators to adapt our research design and procedures to their own needs.

In addition to the manuscript, our paper has been accepted by the Western College Reading and Learning Association Regional Conference in Flagstaff, Arizona in October 1989. The presentation topic is methods of student outcome assessment and retention. Also, Dr. Parrish plans to submit a paper on this evaluation model to the National Association of Developmental Educators Annual Conference in Dallas in the spring of 1990.

ANALYSIS OF THE RETURN OF THE UNIVERSITY'S INVESTMENT

This study contributes to ERAU's continuing efforts to gather pertinent and necessary student outcome information. The results prove that the developmental courses are meeting their academic goals without an unreasonable attrition rate. The data also shows a high degree of student satisfaction with the courses. The suggestions given by the students will serve to strength the educational program for future ERAU students.

This type of information is valuable for curricular planning and also for the upcoming SACS accreditation review in 1993. This study indicates ERAU's strong commitment to improving the educational quality of its academic programs by providing university funds for institutional effectiveness research. It also shows ERAU's commitment to furthering the professional development and research opportunities of its faculty.

This study will also enhance the University's image with professional educators. The publication of the manuscript and the three conference paper presentations will put Embry-Riddle Aeronautical University's name among other research institutions who are encouraging the scholarly activity of their faculty. The investigators' names and institutional affiliation will be published in the journal and on the conference programs.

Lastly, the grant has enabled two faculty members to extend their scholarly inquiry and attain publication. This is an investment in the professional careers and abilities of the investigators.